Chapter 16

National Ambient Air Quality Exceedance Investigations

Chapter 16
National Ambient Air Quality
Exceedance Investigations
Table of Contents

Page

1.0 Introduction

Whenever an exceedance of a National Ambient Air Quality Standard (NAAQS) occurs, it is the responsibility of the reporting organization to report and investigate that exceedance. All investigations shall follow the standard protocol presented here. The purpose of any investigation is to define, and where appropriate, provide evidence for, data influenced by natural or man-made exceptional events.

At the conclusion of any exceedance investigation, there should be reasonable explanation as to the cause of the exceedance. Some exceedances may be due to exceptional/occasional natural or accidental events. To the extent possible, through investigation, this distinction should be clearly demonstrated.

2.0 Exceedance Investigation Reports

2.1 Submitted Requirements

2.1.1 Responsible Party

The Ambient Monitoring Section of the Indiana Department of Environmental Management, Office of Air Quality (IDEM-OAQ) is normally responsible for preparing an exceedance report. However, when a local agency or other source is reporting a parameter that indicates an exceedance, then it shall become their responsibility. Any questions concerning exceedance investigations should be addressed to the IDEM-OAQ Ambient Monitoring Section or the Quality Assurance Section.

2.2 Addresses

Send a copy of each investigation report to:

Ambient Monitoring Branch
Office of Air Quality – Mail code 61-50-2
Indiana Department of Environmental Management
100 N. Senate Avenue
Indianapolis, Indiana 46204-2251

Ambient Monitoring Section IDEM-OAQ

2.3 Timeliness

All investigations should be initiated as soon as possible or at least within one week after the responsible group becomes aware of the exceedance. The investigating group is responsible

for informing the Ambient Monitoring Section that the exceedance has occurred and that an investigation has begun. Notification of the exceedance must be made within 24 hours of the

time which the responsible group becomes aware of the exceedance. For standards based on quarterly, annual, or longer data evaluation periods, significant short term events that would contribute substantially should be reported within 24 hours of an occurrence, as well. (i.e. for a lead filter sample with a concentration value of 6 $\mu g/m^3$ notification would be appropriate). Exceedance investigations should be included with the regular quarterly data report; however, they may be submitted as soon as they are completed.

2.4 Investigation

All investigators should be familiar with chapter 16 of the QA Manual, the violations review process, data submittal process, and EPA-/450/4-86-007 July '86 "Guidelines on the Identification and Use of Air Quality Data Affected by Exceptional Events" and 40 CFR Part 50- "National Primary and Secondary Ambient Air Quality Standards".

3.0 Report Format

3.1 Content

Reports should contain the following information:

a. Date, time, and location of exceedance

b. Date the investigation began and investigating agency

c. Map or diagram of exceedance site may be appropriate especially in cases when an exceptional event has caused or affected the exceedance.

d. Summary of before and after values of the pollutant surrounding the exceedance

e. Meteorological conditions before and during the exceedance. The meteorological conditions should include wind speed, wind direction, temperature, precipitation, relative humidity, and when applicable, stability and mixing height.

f. Field or office investigation to determine if an exceptional event may have had a causative impact on the exceedance

g. Chronology of investigation:
    a. Each person interviewed, the date, and result
    b. Listing of possible causes (point sources, etc.) investigated
    c. Ruling out of possible causes (micro-inventory of sources)

h. Results of the investigation
i. Validity status of data

j. Conclusion:
    a. Brief statement of the reason for the exceedance
    b. Recommendation for flagging of data

3.2 Identification of Events

Exceptional events may be categorized as:

a. Occasionally occurring natural events
b. Unintentionally man-made events
c. Intentionally man-made events

Webster defines “exceptional” as forming an exception, rare uncommon, extraordinary or deviating from the norm. With respect to an air quality it is an event not expected to recur routinely at a given location or that is possibly uncontrollable or unrealistic to control through the SIP process. "Guidelines on the Identification and Use of Air Quality Data Affected by Exceptional Events" EPA 450/4 86 007 July 1, 1986, defines the following "events".

3.2.1 Occasional Natural Events

a. Sustained high wind speeds (PM). This is an hourly average wind speed of greater than or equal to 18 m/s (40 mph) with no precipitation or only light precipitation and dry soil.

b. Stagnation/inversions (all pollutants). A stagnation is a period of 4 or more days with no precipitation or no frontal passages with a wind speed of less than 7.7 m/sec (17 mph). An inversion occurs at a point at which temperature increases with increasing height.

c. Unusual lack of precipitation (PM)

d. Stratospheric ozone intrusion (O_3). This occurs when a parcel of air originating in the stratosphere, average height 20 km (12.4 mi), moves in mass directly to the earth's surface.

e. Forest, grass fires (CO, PM)

f. High pollen count (PM). This is a pollen count index above 25 grains/cm^2 or 1000 grains per cubic meter.

g. Volcanic eruptions emissions have a large-scale area wide impact on air quality. (CO, SO_2 NO_2, PM).

3.2.2 Unintentionally Man-made Events

a. Large accidental structural fires (PM)

b. Major traffic congestion due to accidental property destruction (CO, PM)

c. Chemical Spills (SO_2, PM, CO, NOx)

d. Industrial accidents (SO_2, PM, CO, NOx)

3.2.3 Intentionally Man-made Events

a. Short-term construction/demolition (PM)

b. Sandblasting (PM)

c. High sulfur oil refining (SO_2)

d. Roofing operations (PM, SO_2)

e. Salting/Sanding of streets (PM)

f. Infrequent large gatherings (PM, CO)

g. Soot blowing (PM). This is a method in which air is used to remove deposits that may build up on the walls of utility and industrial boilers.

h. Agricultural tilling (PM)

i. Prescribed burning (PM, CO). This is a controlled fire of vegetative material that is required to protect agricultural or forestry resources or resource values associated with agricultural or forestry operating procedures.

j. Activities after major disasters (SO_2, PM, CO)

4.0 Conclusion

Each exceedance report must offer a conclusion as to the cause of the exceedance. The conclusion may in fact be that the exceedance is a measure of existing ambient pollutant levels for which no specific causative phenomena can be established. The conclusion must be well documented, addressing all applicable events in Section 3.2 and any other reasonable explanations. No clear and universal guidelines can be applied to all reports. Some guidelines are presented below.

4.1 Demonstration of Causal Relationship

a. Include all relevant raw data, i.e., air quality, meteorological data, traffic counts, etc.

b. Show that monitor/analyzer did not record high concentrations before and after the period of the exceptional event.

c. Verify the validity status of the exceedance data.

d. Show the local wind direction was such that the monitored pollutant came from the event to the monitor/analyzer during the period in question if applicable.

e. Include, as appropriate other monitoring data that would support conclusions to the exceedance.

f. Include, as appropriate, microscopic filter analyses.

g. Include documentation that supports the existence and actual occurrence of the exceptional event.